# *EPA Region 7 TMDL Review*

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| *TMDL ID* | 325 | *Water Body ID* | WQLS: 19 |
| *Water Body Name* | Fox Creek Watershed | | |
| *Pollutant* | Biology: Total Phosphorus and Total Nitrogen | | |
| *Tributary* | Palmer Creek 403 | | |
| *State* | KS *HUC* | 11070203 | |
| *Basin* | Neosho | | |
| *Submittal Date* | 11/19/2004 | | |
| *Approved* | approved | | |

**Submittal Letter**

*State submittal letter indicates final TMDL(s) for specific pollutant(s)/ water(s) were adopted by the state, and submitted to EPA for approval under section 303(d) of the Clean Water Act.*

Letter formally submitting this TMDL for approval under Section 303(d) was received November 19, 2004.

**Water Quality Standards Attainment**

*The water body's loading capacity for the applicable pollutant is identified and the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources is described. TMDL and associated allocations are set at levels adequate to result in attainment of applicable water quality standards.*

The water quality standard is narrative: "Surface water shall be free, at all times, from the harmful effects of substances that originate from artificial sources of pollution and that produce any public hazard, nuisance condition or impairment of a designated use." This TMDL links the narrative standard with the macroinvertebrate biological index (MBI), the ephemeroptera, plecoptera, trichoptera (EPT) index, and Kansas Biotic Index (KBI) scores, as well as percent mussel loss. MBIs and EPTs calculated from biological samples were used to determine impairment , as well as the percent mussel loss at station 718. An eighty-two percent increase in the mussel score is noted as a goal for station 718. The loading capacity is identified as < 0.055 mg/L total phosphorus (TP) and <0.502 mg/L total nitrogen (TN) in Fox Creek, and <0.085 mg/L TP and <0.394 mg/L TN in

Palmer Creek, which should result in a fully supporting aquatic life use as indicated by MBI, KBI and EPT biological indice scores.

**Numeric Target(s)**

*Submittal describes applicable water quality standards, including beneficial uses, applicable numeric and/or narrative criteria. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression, site specific if possible, was developed from a narrative criterion and a description of the process used to derive the target is included in the submittal.*

All beneficial uses are described. The water quality standard is narrative, and the numeric biological indice targets are indirectly related to a numeric translation of the narrative standard. The numeric targets for TP and TN were determined using site specific chemistry and biological data collected in the watershed; the endpoint is no more than one sampling with a MBI score of greater than 4.5 over 2007-2011. The decrease in nutrient levels will apply over the range of flows encountered on Fox and Palmer Creeks, indicated by the TMDL load curves for TN and TP.

**Link Between Numeric Target(s) and Pollutant(s) of concern**

*An explanation and analytical basis for expressing the TMDL through surrogate measures (e.g., parameters such as percent fines and turbidity for sediment impairments, or chlorophyll-a and phosphorus loadings for excess algae) is provided, if applicable. For each identified pollutant, the submittal describes analytical basis for conclusions, allocations and margin of safety that do not exceed the load capacity.*

There appears to be a direct link between elevated levels of nutrients and MBI scores indicating partial or full impairment. Ambient stream chemistry data was collected bracketing the period when a General Management/Environmental Impact Statement was implemented by the National Park Service, and provided an action plan detailing ways to reduce the pollution in the Fox Creek watershed; each of the biological samples collected were analyzed and indicated impairment of the biological community/aquatic life was correlated with elevated nutrients, there have been no violations of chronic water quality criteria. Initial TMDL goals are to lower ambient concentrations of TP and TN below levels seen prior to December 2000. This is a phased TMDL and final attainment is based on MBI scores of 4.5 or less.

**Source Analysis**

*Important assumptions made in developing the TMDL, such as assumed distribution of land use in the watershed, population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources, are described. Point, non point and background sources of pollutants of concern are described, including magnitude and location of the sources. Submittal demonstrates all significant sources have been considered.*

Animal waste from grazing areas is the primary contributing factor; ninety-three percent of the land use is grassland. The winter grazing density is high, and the summer grazing density is medium. A secondary source of nutrients is likely runoff from cropland in the southern half of Fox Creek. The majority of the watershed lies within the boundary of the Tallgrass Prairie National Preserve. All significant sources have been considered.

**Allocation**

*Submittal identifies appropriate wasteload allocations for point, and load allocations for nonpoint sources. If no point sources are present the wasteload allocation is zero. If no nonpoint sources are present, the load allocation is zero.*

This is a phased TMDL, and, the link between the attainment metric and the allocated pollutants is direct. The allocations are expressed as TMDL load duration curves in pounds/day of TN and TP, before and after the BMPs were installed, for both the Fox Creek and Palmer Creek stations.

**WLA Comment**

The WLA is is zero.

**LA Comment**

The load allocation is defined as loads occurring at all flows, therefore the entire area under the load duration curves constitutes the load allocation. At the Fox Creek station this calls for a 0% reduction of TP and a 25% reduction in TN; the Palmer Creek station would realize a 42% reduction in TP and a 0% reduction in TN.

**Margin of Safety**

*Submittal describes explicit and/or implicit margin of safety for each pollutant. If the MOS is implicit, the conservative assumptions in the analysis for the MOS are described. If the MOS is explicit, the loadings set aside for the MOS are identified and a rationale for selecting the value for the MOS is provided.*

The endpoint is an adequate MBI value. The margin of safety is explicit and provides additional biological measures using the EPT (ephemeroptera, plecoptera, trichoptera index) making up at least 48% of the sample population, including ammonia intolerant species, when MBI values are 4.5 or lower. This will ensure that the majority of aquatic macroinvertebrate population is composed of pollution intolerant taxa.

**Seasonal Variation and Critical Conditions**

*Submittal describes the method for accounting for seasonal variation and critical conditions in the TMDL(s).*

Seasonal variation is accounted for in this TMDL by the TMDL curves which represent all flow conditions.

**Public Participation**

*Submital describes public notice and public comment opportunity, and explains how the public comments were considered in the final TMDL(s).*

Public meetings to discuss TMDLs in the Neosho Basin were held on January 9, 2002 in Burlington and March 4, 2002, in Council Grove. Public hearings were held in Burlington and Parsons on June 3, 2002. The Neosho Basin Advisory Committee met to discuss TMDLs in the basin on October 2, 2001, January 9, March 4, and June 3, 2002. Meetings to discuss the TMDLs with interest groups include the Kansas Farm Bureau. An active internet web site is established at http://www.kdhe.state.ks.us/tmdl for the public to review draft and final TMDLs.

**Monitoring Plan for TMDL(s) Under Phased Approach**

*The TMDL identifies the monitoring plan that describes the additional data to be collected to determine if the load reductions required by the TMDL lead to attainment of WQS, and a schedule for considering revisions to the TMDL(s) (where phased approach is used).*

KDHE will continue to collect and evaluate seasonal biological samples for three years over 2002-2007 and an additional three years over 2007-2011 to evaluate continued ammonia levels below the detection limit of 0.10 mg/L and achievement of the desired biological endpoint. Mussel loss data must be collected at station 719 to verify if a true impairment exists on Palmer Creek.

**Reasonable assurance**

*Reasonable assurance only applies when reduction in nonpoint source loading is required to meet the prescribed waste load allocations.*

Reasonable assurances, although not required for this TMDL, include authorities such as state statutes, regulations, and funding from the State Water Plan Fund.